

CLAIMS

We claim:

1. A water-based composition for decontamination of chemical and biological toxicants comprising:

one or more oxidants; and

one or more halides.

2. The water-based composition of claim 1, wherein

at least one of the oxidants is selected from the group consisting of: a monopersulfate compound in the forms derived from alkali metal salt of peroxymonosulfuric acid alone or in combination with the alkali metal salts of sulfuric or persulfuric acid; perborate, peracetate, percarbonate, hydrogen peroxide; and dioxirane compounds; and

at least one of the halides is selected from the group consisting of an alkali metal, alkaline earth or transition metal halide salt; or seawater.

3. The water-based composition of claims 1 or 2 wherein the oxidant(s) are present in a concentration of about 0.1-40% w/v, and the halide(s) are present in a concentration of about 0.1-40% w/v.

4. The water-based composition of claims 1 or 2, wherein the oxidant(s) are present in a concentration of about 1-20% w/v, and the halide(s) are present in a concentration of about 1-20% w/v.

5. A water-based composition for decontamination of chemical and biological toxicants comprising:

one or more oxidants, at least one of which is selected from the group consisting of: a monopersulfate compound in the forms derived from alkali metal salt of peroxymonosulfuric acid alone or in combination with the alkali metal salts of sulfuric or persulfuric acid; perborate, peracetate, percarbonate, hydrogen peroxide; and dioxirane compounds;

one or more halides, at least one of which is selected from the group consisting of an alkali metal, alkaline earth or transition metal halide salt; or seawater;

one or more cosolvents, at least one of which is selected from the group consisting of acetonitrile, propylene carbonate, propylene glycol, polypropylene glycol and tert-butanol; and

one or more surfactants, at least one of which is selected from the group consisting of tetrabutylammonium hydrogen sulfate (TBAHS), Triton-X, and cetyltrimethylammonium (CTMA).

6. The water-based composition of claim 5, wherein the oxidant(s) are present in a concentration of about 0.1-40% w/v, the halide(s) are present in a concentration of about 0.1-40% w/v, the surfactant(s) are present in a concentration of about 0.01-15% w/v and the co-solvent(s) are present in a concentration of about 10-80% w/v.

7. The water-based composition of claim 5, wherein the oxidant(s) are present in a concentration of about 1-20% w/v, the halide(s) are present in a concentration of about 1-20% w/v, the surfactant(s) are present in a concentration of about 0.01-5% w/v and the co-solvent(s) are present in a concentration of about 10-80% w/v.

8. A water-based composition for decontamination of chemical and biological toxicants comprising:

one or more oxidants, at least one of which is selected from the group consisting of: a monopersulfate compound in the forms derived from alkali metal salt of peroxymonosulfuric acid alone or in combination with the alkali metal salts of sulfuric or persulfuric acid; perborate, peracetate, percarbonate, hydrogen peroxide; and dioxirane compounds;

one or more halides, at least one of which is selected from the group consisting of an alkali metal, alkaline earth or transition metal halide salt; or seawater; and

a buffer capable of bringing the composition to a pH in the range of approximately 4 to approximately 10.

9. The water-based composition of claim 8, wherein the buffer is selected from the group consisting of alkali metal salt forms of carbonate and bicarbonate, or phosphate.

10. The water-based composition of claim 8, having a pH of between approximately 6 and approximately 8.5.

11. The water-based composition of claim 8, 9 or 10, wherein the oxidant(s) are present in a concentration of about 0.1-40% w/v, the halide(s) are present in a concentration of about 0.1-40% w/v, and the buffer is present in a concentration range of about 0.05-20% w/v.

12. The water-based composition of claims 8, 9 or 10, wherein the oxidant(s) are present in a concentration of about 1-20% w/v, the halide(s) are present in a concentration of about 1-20% w/v, and the buffer is present in a concentration range of about 0.5-10% w/v.

13. The water-based composition of claims 8, 9 or 10, further comprising one or more cosolvents; and one or more surfactants.

14. The water-based composition of claim 13, wherein the oxidant(s) are present in a concentration of about 1-20% w/v, the halide(s) are present in a concentration of about 1-20% w/v, the surfactant(s) are present in a concentration of about 0.01-5% w/v, the co-solvent(s) are present in a concentration of about 10-80% w/v, and the buffer is present in a concentration range of about 0.5-10% w/v.

15. A water-based composition for decontaminating organosulfur and organophosphorous-containing compounds, and chemical blister and nerve agents comprising:

one or more oxidants; and

one or more halides.

16. The water-based composition of claim 15, wherein

at least one of the oxidants is selected from the group consisting of: a monopersulfate compound in the forms derived from alkali metal salt of peroxymonosulfuric acid alone or in combination with the alkali metal salts of sulfuric or persulfuric acid; perborate, peracetate, percarbonate, hydrogen peroxide; and dioxirane compounds; and

at least one of the halides is selected from the group consisting of an alkali metal, alkaline earth or transition metal halide salt; or seawater.

17. The water-based composition of claims 15 or 16 wherein the oxidant(s) are present in a concentration of about 0.1-40% w/v, and the halide(s) are present in a concentration of about 0.1-40% w/v.

18. The water-based composition of claims 15 or 16, further comprising

one or more cosolvents, at least one of which is selected from the group consisting of acetonitrile, propylene carbonate, propylene glycol, polypropylene glycol and tert-butanol; and

one or more surfactants, at least one of which is selected from the group consisting of tetrabutylammonium hydrogen sulfate (TBAHS), Triton-X, and cetyltrimethylammonium (CTMA).

19. The water-based composition of claim 18, wherein the oxidant(s) are present in a concentration of about 0.1-40% w/v, the halide(s) are present in a concentration of about 0.1-40% w/v, the surfactant(s) are present in a concentration of about 0.01-15% w/v and the co-solvent(s) are present in a concentration of about 10-80% w/v.

20. The water-based composition of claim 18, wherein the oxidant(s) are present in a concentration of about 1-20% w/v, the halide(s) are present in a concentration of about 1-20% w/v, the surfactant(s) are present in a concentration of about 0.01-5% w/v and the co-solvent(s) are present in a concentration of about 10-80% w/v.

21. A water-based composition for decontaminating organosulfur and organophosphorous-containing compounds, and chemical blister and nerve agents comprising:

one or more oxidants, at least one of which is selected from the group consisting of: a monopersulfate compound in the forms derived from alkali metal salt of peroxymonosulfuric acid alone or in combination with the alkali metal salts of sulfuric or persulfuric acid; perborate, peracetate, percarbonate, hydrogen peroxide; and dioxirane compounds;

one or more halides, at least one of which is selected from the group consisting of an alkali metal, alkaline earth or transition metal halide salt; or seawater; and

a buffer capable of bringing the composition to a pH in the range of approximately 4 to approximately 10.

22. The water-based composition of claim 21, wherein the buffer is selected from the group consisting of alkali metal salt forms of carbonate and bicarbonate, or phosphate.

23. The water-based composition of claim 21, having a pH of between approximately 6 and approximately 8.5.

24. The water-based composition of claim 22, wherein the oxidant(s) are present in a concentration of about 0.1-40% w/v, the halide(s) are present in a concentration of about 0.1-40% w/v, and the buffer is present in a concentration range of about 0.05-20% w/v.

25. The water-based composition of claims 21 or 22, wherein the oxidant(s) are present in a concentration of about 1-20% w/v, the halide(s) are present in a concentration of about 1-20% w/v, and the buffer is present in a concentration range of about 0.5-10% w/v.

26. The water-based composition of claims 21, 22 or 23, further comprising one or more cosolvents; and one or more surfactants.

27. The water-based composition of claim 26, wherein the oxidant(s) are present in a concentration of about 1-20% w/v, the halide(s) are present in a concentration of about 1-20% w/v, the surfactant(s) are present in a concentration of about 0.01-5% w/v, the

co-solvent(s) are present in a concentration of about 10-80% w/v, and the buffer is present in a concentration range of about 0.5-10% w/v.

28. A water-based composition for decontaminating viruses, bacteria, spores, fungi, and toxins, comprising:

one or more oxidants; and

one or more halides.

29. The water-based composition of claim 28, wherein

at least one of the oxidants is selected from the group consisting of: a monopersulfate compound in the forms derived from alkali metal salt of peroxymonosulfuric acid alone or in combination with the alkali metal salts of sulfuric or persulfuric acid; perborate, peracetate, percarbonate, hydrogen peroxide; and dioxirane compounds; and

at least one of the halides is selected from the group consisting of an alkali metal, alkaline earth or transition metal halide salt; or seawater.

30. The water-based composition of claims 28 or 29 wherein the oxidant(s) are present in a concentration of about 0.1-40% w/v, and the halide(s) are present in a concentration of about 0.1-40% w/v.

31. The water-based composition of claims 28 or 29 further comprising

one or more cosolvents, at least one of which is selected from the group consisting of acetonitrile, propylene carbonate, propylene glycol, polypropylene glycol and tert-butanol; and

one or more surfactants, at least one of which is selected from the group consisting of tetrabutylammonium hydrogen sulfate (TBAHS), Triton-X, and cetyltrimethylammonium (CTMA).

32. The water-based composition of claim 31, wherein the oxidant(s) are present in a concentration of about 0.1-40% w/v, the halide(s) are present in a concentration of about 0.1-40% w/v, the surfactant(s) are present in a concentration of about 0.01-15% w/v and the co-solvent(s) are present in a concentration of about 10-80% w/v.

33. The water-based composition of claim 31, wherein the oxidant(s) are present in a concentration of about 1-20% w/v, the halide(s) are present in a concentration of about 1-20% w/v, the surfactant(s) are present in a concentration of about 0.01-5% w/v and the co-solvent(s) are present in a concentration of about 10-80% w/v.

34. A water-based composition for decontaminating viruses, bacteria, spores, fungi, and toxins, comprising:

one or more oxidants, at least one of which is selected from the group consisting of: a monopersulfate compound in the forms derived from alkali metal salt of peroxymonosulfuric acid alone or in combination with the alkali metal salts of sulfuric or persulfuric acid; perborate, peracetate, percarbonate, hydrogen peroxide; and dioxirane compounds;

one or more halides, at least one of which is selected from the group consisting of an alkali metal, alkaline earth or transition metal halide salt; or seawater; and

a buffer capable of bringing the composition to a pH in the range of approximately 4 to approximately 10.

35. The water-based composition of claim 34, wherein the buffer is selected from the group consisting of alkali metal salt forms of carbonate and bicarbonate, or phosphate.

36. The water-based composition of claim 34, having a pH of between approximately 6 and approximately 8.5.

37. The water-based composition of claim 34, wherein the oxidant(s) are present in a concentration of about 0.1-40% w/v, the halide(s) are present in a concentration of about 0.1-40% w/v, and the buffer is present in a concentration range of about 0.05-20% w/v.

38. The water-based composition of claims 34 or 35, wherein the oxidant(s) are present in a concentration of about 1-20% w/v, the halide(s) are present in a concentration of about 1-20% w/v, and the buffer is present in a concentration range of about 0.5-10% w/v.

39. The water-based composition of claims 34, 35 or 36, further comprising one or more cosolvents; and one or more surfactants.

40. The water-based composition of claim 39, wherein the oxidant(s) are present in a concentration of about 1-20% w/v, the halide(s) are present in a concentration of about 1-20% w/v, the surfactant(s) are present in a concentration of about 0.01-5% w/v, the co-solvent(s) are present in a concentration of about 10-80% w/v, and the buffer is present in a concentration range of about 0.5-10% w/v.